

#398

PIONEER 10

ENCOUNTER 1 MIN. AVG DATA PLOTS
72-012A-01E

HOURLY & DAILY MAGNETIC FIELD AVG
72-012A-01H

Pioneer 10

72-012A-01E

Magnetometer Data

One Minute, Hourly and Daily Magnetic Field Averages

72-012A-01H

Magnetometer Data

Hourly and Daily Magnetic Field Average

The data set 72-012A-01E, has been restored onto four tapes. They were created on the VAX computer, retaining the original IBM format. The tapes are 9 track, 6250 BPI, multi-filed and written in ASCII format. Any tapes which contained read errors were padded to maintain the original data format by execution of [operations.barbara.progs]pio.for. Files 1 & 2 on tape DS02639 contain encounter data, the remaining files on the tape contain cruise data, as do the other tapes.

The 72-012A-01H data set was created by selecting the hourly and daily magnetic field data from the Pioneer 10, 72-012A-01E dataset, after restoration, by execution of the program newpio.for. The format remains the same as 72-012A-01E, except there are no minute averages. Records 1 thru 63 are encounter data, the remaining records on the tape are cruise data.

The DR and DS numbers, files per tape and time spans followed by the D and C numbers being restored and the corresponding file numbers for 72-012A-01H, and the D and C numbers along with the time spans for 72-012A-01E follow:

72-012A-01E One Minute, Hourly and Daily Magnetic Field Averages

| DR | DS | D# | FILES | TIME SPAN |
|---------|---------|---------|-------|---------------------|
| DR02639 | DS02639 | D-29893 | 1 | 07/30/72 - 09/02/72 |
| | | D-29894 | 2 | 09/02/72 - 09/30/72 |
| | | D-34416 | 3 | 02/27/72 - 04/01/72 |
| | | D-34417 | 4 | 04/02/72 - 04/29/72 |
| | | D-34418 | 5 | 04/30/72 - 06/03/72 |
| | | D-34419 | 6 | 06/04/72 - 07/01/72 |
| | | D-34420 | 7 | 07/02/72 - 07/29/72 |
| | | D-34421 | 8 | 07/30/72 - 09/02/72 |
| | | D-34422 | 9 | 09/03/72 - 09/30/72 |
| | | D-34423 | 10 | 10/01/72 - 10/28/72 |
| | | D-34424 | 11 | 10/29/72 - 12/02/72 |
| | | D-34425 | 12 | 12/03/72 - 12/30/72 |

| DR# | DS# | D# | FILES | TIME SPAN |
|---------|---------|---------|-------|---------------------|
| DR02640 | DS02640 | D-34426 | 1 | 12/31/72 - 02/03/73 |
| | | D-34427 | 2 | 02/04/73 - 03/03/73 |
| | | D-34428 | 3 | 03/04/73 - 03/30/73 |
| | | D-34429 | 4 | 04/01/73 - 04/28/73 |
| | | D-34430 | 5 | 04/29/73 - 06/02/73 |
| | | D-34431 | 6 | 06/03/73 - 06/30/73 |
| | | D-34432 | 7 | 07/01/73 - 07/28/73 |
| | | D-34433 | 8 | 07/29/73 - 09/01/73 |
| | | D-34434 | 9 | 09/02/73 - 09/29/73 |
| | | D-34435 | 10 | 09/30/73 - 11/03/73 |
| | | D-34436 | 11 | 11/04/73 - 11/24/73 |
| | | D-37949 | 12 | 11/25/73 - 12/15/73 |
| | | D-34437 | 13 | 12/16/73 - 12/29/73 |
| DR02641 | DS02641 | D-34438 | 1 | 12/30/73 - 02/02/74 |
| | | D-34439 | 2 | 02/02/74 - 03/02/74 |
| | | D-34440 | 3 | 03/03/74 - 03/30/74 |
| | | D-34441 | 4 | 03/31/74 - 04/27/74 |
| | | D-34442 | 5 | 04/28/74 - 06/01/74 |
| | | D-34443 | 6 | 06/02/74 - 06/29/74 |
| | | D-34444 | 7 | 06/30/74 - 08/03/74 |
| | | D-34445 | 8 | 08/04/74 - 08/31/74 |
| | | D-34446 | 9 | 09/01/74 - 09/28/74 |
| | | D-34447 | 10 | 09/29/74 - 11/02/74 |
| | | D-34448 | 11 | 11/03/74 - 11/30/74 |
| | | D-34449 | 12 | 12/04/74 - 12/28/74 |
| | | D-43925 | 13 | 12/29/74 - 02/01/75 |
| DR02642 | DS02642 | D-43926 | 1 | 02/02/75 - 03/01/75 |
| | | D-43927 | 2 | 03/02/75 - 03/29/75 |
| | | D-43928 | 3 | 03/30/75 - 05/03/75 |
| | | D-43929 | 4 | 05/04/75 - 05/31/75 |
| | | D-43930 | 5 | 06/01/75 - 06/28/75 |
| | | D-43931 | 6 | 06/29/75 - 08/02/75 |
| | | D-43932 | 7 | 08/03/75 - 08/30/75 |
| | | D-43933 | 8 | 08/31/75 - 09/27/75 |
| | | D-43934 | 9 | 09/28/75 - 11/01/75 |
| | | D-43935 | 10 | 11/02/75 - 11/17/75 |

D29608 WAS REPLACED BY D37949 BEFORE THIS DATA SET WAS RESTORED.

72-012A-01H Hourly and Daily Magnetic Field Averages

D-83151 C-28037 07/30/72 - 09/30/73 Encounter Data
02/27/72 - 11/17/75 Cruise Data

FORMAT OF PIONEER 10,11 AVERAGE DATA RECORD:
VECTOR HELIUM MAGNETOMETER

72-012A-01E Encounter 1 min. Avg Data Plots

72-012A-01H Hourly & Daily Magnetic Field Avg.

The Pioneer VHM Average data record (ADR) tapes are written on 9-track tapes at 6250 BPI. The data is written on the tape in odd parity, ASCII format.

A data set contains an integral number (usually four or five) weeks of data. Each of the seven days in a week consists of fifty blocks (physical records). The first block for a day is a single logical record of 120 tape characters. The remaining blocks for a day each consist of 30 logical records of 240 tape characters each.

The first logical record for a day is a header. the next 1440 logical records contain minute averages. The next 24 logical records contain hour averages. The next logical record contains daily averages. The last 5 logical records for the day contain blanks.

72-012A-01H

Header is 24 logical records of hour averages, then one logical record of daily averages.

Table 1 - Header Record

| Variable | Format | Description |
|----------|-----------|--|
| | 3X | |
| IYR | I2 2X | Last two digits of year |
| IDAY | I3 4X | Day of year |
| ISC | A1 15X | Spacecraft (F or G) |
| HRANGP | E15.7 | Distance of spacecraft from Sun (km) |
| CELLTP | E15.7 | Heliocentric celestial latitude of spacecraft (degrees) |
| CELLNP | E15.7 | Heliocentric celestial longitude of spacecraft (degrees) |
| REARSU | E15.7 | Distance of earth from the Sun |
| CELLTE | E15.7 | Heliocentric celestial latitude of Earth (degrees) |
| CELLNE | E15.7 | Heliocentric celestial longitude of Earth (degrees) |

Table 2 - Average Records

| <u>Variable</u> | <u>Format</u> | <u>Description</u> |
|-----------------|---------------|--|
| DT | E15.7 | Number of milliseconds for which data exists in the period over which the average was taken. |
| EV(1) | E15.7 | $\langle B_R \rangle$ |
| EV(2) | E15.7 | $\langle B_T \rangle$ |
| EV(3) | E15.7 | $\langle B_N \rangle$ |
| EV(4) | E15.7 | $\langle B_R^2 \rangle$ |
| EV(5) | E15.7 | $\langle B_R B_T \rangle$ |
| EV(6) | E15.7 | $\langle B_R B_N \rangle$ |
| EV(7) | E15.7 15x | $\langle B_T^2 \rangle$ |
| EV(8) | E15.7 | $\langle B_T B_N \rangle$ |
| EV(9) | E15.7 | $\langle B_N^2 \rangle$ |
| EV(10) | E15.7 | $\langle \cos \alpha \rangle = \langle B_R / B \rangle$ |
| EV(11) | E15.7 | $\langle \cos \beta \rangle = \langle B_T / B \rangle$ |
| EV(12) | E15.7 | $\langle \cos \nu \rangle = \langle B_N / B \rangle$ |
| EV(13) | E15.7 | $\langle B \rangle$ |
| EV(14) | E15.7 | $\langle B ^2 \rangle$ |

June 28, 1977

TO: Pioneer 10 and 11 VHM Co-Investigators

FROM: Bruce Tsurutani and Edward Smith *B.T.*

SUBJECT: Pioneer 10 Average Tapes for the First 6 Months of 1975, *March*

These seven average tapes are presently enroute to you. The following data anomalies have been detected:

| <u>Month</u> | <u>Year</u> | <u>Day</u> | <u>Time</u> | <u>Description</u> | <u>Comment</u> |
|--------------|-------------|------------|-------------|--|--|
| | | | | After a long gap, a spike in the field orientation sometimes occurs. This can take the form either as a one point spike at the start of the data, or as a few minutes of data, a gap, and then a continuous stream of data at a different field orientation. | The data with the incorrect orientation the point spike or the few minutes of data isolated by gaps, are caused by the lack of an up-data in the s/c orientation found the AMEs EDR header. We will call this ITC 112 error. |
| Jan | 1975 | 15 | 1845UT | | ITC 112 error |
| | | 17 | 2129 | | |
| | | 18 | 1829 | | |
| | | 19 | 1920-1923 | | |
| | | 22 | 2328-2333 | | |
| | | 26 | 1820-1823 | | |
| | | 27 | 1015-1018 | | |
| | | 29 | 2229-2231 | | |
| | | 30 | 1505 | | |
| | | 32 | 1808 | | |
| | | 27 | 1057 | B Magnitude Spike | |
| | | | 1103 | | |
| | | | 1106 | | |
| | | | 1119 | | |
| | | | 1127 | | |
| | | | 1135 | | |
| | | | 1151 | | |
| | | | 1211 | | |
| | | | 1215 | | |
| | | | 1320 | | |
| | | | 1326 | | |
| | | | 1348 | | |
| | | | 1414 | | |
| | | | | | Bit Error |

| <u>Month</u> | <u>Year</u> | <u>Day</u> | <u>Time</u> | <u>Description</u> | <u>Comment</u> |
|--------------|-------------|------------|-------------|---|--|
| Feb | 1975 | | | | |
| | | 33 | 2033-2037 | ITC 112 error ↓ (listed to nearest hour, i.e., the error occurs between 2100 and 2200 UT) | |
| | | 37 | 0945 | | |
| | | 37 | 2303-2308 | | |
| | | 38 | 1500-1502 | | |
| | | 40 | 1530 | | |
| | | 40 | 2255-2258 | | |
| | | 41 | 1505 | | |
| | | 42 | 1528 | | |
| | | 42 | 2100 | | |
| | | 43 | 0100 | | |
| | | 43 | 2100 | | |
| | | 44 | 1500 | | |
| | | 44 | 2100 | | |
| | | 45 | 0900 | | |
| | | 46 | 1400 | | |
| | | 47 | 0900 | | |
| | | 48 | 0900 | | |
| | | 48 | 1800 | | |
| | | 50 | 1600 | | |
| | | 52 | 1600 | | |
| | | 54 | 1100 | | |
| | | 54 | 2200 | | |
| | | 55 | 1500 | | |
| | | 57 | 1600 | | |
| | | 59 | 2000 | | |
| March | 1975 | 61 | 2100-2400 | Wiggly Data ITC112 Error, listed to nearest hour | Aliased Instrument Noise |
| | | 63 | 1600 | | |
| | | 64 | 1200 | | |
| | | 65 | 1600 | | |
| | | 67 | 1500 | | |
| | | 68 | 1500 | | |
| | | 69 | 1600 | | |
| | | 72 | 1200 | | |
| | | 73 | 1200 | | |
| | | 75 | 1200 | | |
| | | 76 | 1200 | | |
| | | 76 | 2100 | | |
| | | 78 | 1500 | | |
| | | 79 | 1500 | | |
| | | 81 | 0900 | | |
| | | 84 | 2000 | | |
| | | 86 | 0823 | B Magnitude Spike B _y , B _z Spike | Bit Error too few data points plus incorrect orientation |
| | | 88 | 2114 | | |

| <u>Month</u> | <u>Year</u> | <u>Day</u> | <u>Time</u> | <u>Description</u> | <u>Comment</u> |
|--------------|-------------|------------|--------------|---|--|
| April | 1975 | 93 | 1923 | B Magnitude | Incorrect Data inserted into time slot. |
| | | 93 | 2008 | | |
| | | 94 | 1730 | | |
| | | 97 | 2105-2117 | Incorrect Field Orientation | Bit Error ITC112 Error |
| | | 102 | 2210-2220 | " " | |
| | | 103 | 0300-1500 | | Aliased Instrument noise Bit Rate 1. |
| | | 108 | 2100-2330 | | Aliased Instrument noise Bit Rate 2. |
| | | 119 | 0746 | Spike at end of data | 1 minute average made from too few data points |
| | | 119 | 0748 | One isolated point | |
| | | 123 | 1530-2330 | | Aliased instrument noise. Bit Rate 1 and 2. |
| May | 1975 | 124 | 1423-1429 UT | Field Orientation Error | Incorrect spin in EDR header. |
| | | 127 | 2216-2226 | | Negative spin period values. |
| | | 134 | 0845 | B Magnitude Spike | Bit error in range value. |
| | | 134 | 1129 | | |
| | | 135 | 1925-1930 | Low B Magnitude Fields | Incorrect data inserted into time slot. |
| | | 147 | 1840-1852 | Sinusoidal B _y and B _z components | Negative spin periods on EDR header. |
| | | 148 | 0329 | B Magnitude Spike | Bit error in range value. |
| | | 155 | 1037 | | Possible bit error |
| June | 1975 | 155 | 1053 | | |
| | | 157 | 0947 | | Bit error in range value |
| | | 158 | 1829-1900 | Peculiar Fields | Negative spin period on EDR header. |
| | | 158 | 1950 | B Magnitude Spike | Bit error |
| | | 162 | 1845-1858 | Peculiar Fields | Negative spin periods given on EDR header. |
| | | 168 | 2037-2055 | Field Orientation Error | Incorrect sensor flag on EDR header. |
| | | 170 | 0824 | B Magnitude Spike | Bit error on z axis |
| | | 173 | 0540 | | Bit error in range value. |
| | | 173 | 0609 | | |
| 173 | 0623 | | | | |

March 14, 1978

TO: Pioneer 10 Co-Investigators
 FROM: Bruce Tsurutani/Ed Smith
 CONCERNING: July, August, September, October and November 1975
 Pioneer 10 Average Tapes

The above five average data tapes are presently enroute to you. The data anomalies and their causes are listed below:

| <u>S/C</u> | <u>Month</u> | <u>Day</u> | <u>Time</u> | <u>Description</u> | <u>Comments</u> |
|------------|--------------|------------|-------------|------------------------|--|
| 10 | July | 180 | ~0200-0600 | wave-like data | Aliased instrument noise due to very low field magnitudes and low bit rates. For more details, see memo to the magnetometer team dated 14 April 1977. Bit rate 1 |
| | | 183 | ~1000 | wave-like data | " " BR 1, 2 |
| | | 184 | ~2100-0130 | wave-like data | " " BR 5 |
| | | 186 | 0120-0700 | wave-like data | " " BR 0, 1, 2 |
| | | 194 | ~1000-1600 | wave-like data | " " BR 1, 2 |
| | | 202 | 0900-1600 | wave-like data | " " BR 1, 2 |
| | | 207 | ~0800-0900 | wave-like data | " " BR 1 |
| | | 208 | ~0600-0900 | wave-like data | " " BR 5 |
| | | 209 | 1010-1800 | wave-like data | " " BR 0, 1, 2 |
| | August | 221 | 1442-1445 | spike in B_y , B_z | Incorrect orientation given in AMEs EDR header |
| | | 223 | 0705 | spike in B_z | Too few data points in one minute average |
| | | 229 | ~730-1600 | wave-like data | Aliased instrument noise. BR 1 |
| | | 231 | ~840-1600 | wave-like data | Aliased instrument noise. BR 1, 2 |
| | | 234 | 1345 | spike in B_z | The anomaly is not completely understood |
| | | 236 | ~0420-0800 | wave-like data | Aliased instrument noise. BR 0, 2 |

| <u>S/C</u> | <u>Month</u> | <u>Day</u> | <u>Time</u> | <u>Description</u> | <u>Comments</u> |
|------------|--------------|------------|-------------|-----------------------------------|--|
| 10 | August | 239-40 | ~0900-1300 | wave-like data | Aliased instrument noise. BR 0, 1, 2 |
| | | 241-2 | ~0530-2000 | wave-like data | Aliased instrument noise. BR 1, 2 |
| | Sept. | 243-245 | 0900-1600 | wave-like data | Aliased instrument noise. BR 1, 2 |
| | | 252 | 1324-1326 | spike in B_z component | Spacecraft orientation incorrectly given on AMEs EDR header. |
| | Oct. | 279 | ~0330-0500 | wave-like data | Aliased instrument noise. BR 0 |
| | | 284 | 1833 | spike in B_y, B_z components | Incorrect attitude information given on AMEs EDR header. See error explanation for Dec. 1974 P/10 data tape. |
| | | 290 | 0405 | spike in B_y, B_z | Average made from one data vector. |
| | | 298 | ~0342-0528 | wave-like data | Aliased instrument noise. BR 0 |
| | Nov. | 315 | ~1015-1030 | wave-like data | Aliased instrument noise. BR 1 |

BTT:ydj

cc: E. R. Parker

| | | | | | | |
|-------------|--------------|--------------|--------------|--------------|--------------|--------------|
| 915+CC | -3013996+CC | .9148552-01 | -3288000+07 | -.6639912-02 | -2846194+00 | -.4461180-01 |
| -4145128-02 | -.2312580-02 | .5097285-04 | .8159836-01 | | -.1266495-01 | -.2601561 |
| -02 | -.1684616-01 | -.9618185+00 | -.1511560+00 | -2963106+00 | -.8834504-01 | -.0000000 |
| 000000 | .0000000 | .0000000 | .0000000 | .0000000 | .0000000 | .0000000 |
| CC0 | -.0000000 | .0000000 | .0000000 | .0000000 | .0000000 | .0000000 |
| CC0 | -.0000000 | .2430000+07 | -.1245660-01 | .2864149+00 | -.8781829-01 | .3430392-02 |
| -3239902-02 | -.1253980-02 | .8267542-01 | | -.2482794-01 | .9542488-02 | -.4175260 |
| -01 | .9286424+00 | -.2846262+00 | | -.8446934-03 | .8543251-01 | -.1045177-01 |
| 910802+00 | -.9718071-01 | .3084611+00 | .9564838-01 | | .3450000+07 | .3165596+00 |
| -2781950-01 | .1130867-01 | .3616553-01 | .9197147+00 | -.3068553+00 | -.3791719-02 | -.1430204-02 |
| 370+00 | .3048000+07 | -.4198450-02 | .2590716+00 | -.1346426+00 | -.1871544-01 | -.9896583-02 |
| .6910609-03 | .6763144-01 | | -.3478920-01 | .1871544-01 | -.9896583-02 | .8661368 |
| +00 | -.4502299+00 | .2993323+00 | .9013860-01 | .3402000+07 | -.2694417-01 | -.2981891+00 |
| 470073-01 | .4013465-02 | -.8276160-02 | .2680144-02 | .8942228-01 | | -.2812258-01 |
| 600+07 | -.4390989-01 | -.7974019-01 | .9307437+00 | -.2954319+00 | .3206094+00 | .1033733+00 |
| .7945378-01 | | .2809447+00 | -.6769653-01 | .5455787-02 | -.1242194-01 | .2958663-02 |
| +00 | -.2989394+00 | .8999104-01 | -.1898580-01 | .5081483-02 | -.1409936+00 | .9409114+00 |
| 578774-02 | -.1380704-01 | .1731630-02 | .3588000+07 | -.4735675-01 | -.2852575+00 | -.3497661-01 |
| -1512505+00 | .9596528+00 | -.1189260+00 | .8196561-01 | | -.9835599-02 | -.1872276-02 |
| 375-01 | .3075562+00 | -.3016562-01 | .5064795-02 | -.1276408-01 | -.1229816-02 | .9504744-01 |
| +00 | -.9288909-02 | .1329303-02 | -.1210970+00 | .9695695+00 | -.9509642-01 | .3175404 |
| 497771-02 | .4449000+08 | -.2582278-01 | .2774928+00 | -.4832947-01 | .4888238-02 | -.7 |
| 9409549+00 | -.6363703-03 | .7798637-01 | -.1373059-01 | .5322116-02 | -.8256023-01 | |
| | -.1571495+00 | .2952106+00 | .8819673-01 | | | |

***** JOB DONE.
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